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Scientist and Entrepreneur: A Chat with Ernesto Illy on Coffee, Complexity and Prigogine

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My relationship with Prigogine

You began to deal with complexity in the early 70s and, in a way, you are a prophet in the application of the complexity theory to the management. In those years, you met Ilya Prigogine who had not even been awarded with the Nobel prize yet. How did you meet Prigogine?

I gained an insight into Prigogine's thought by reading the scientific section of the *Zuricher Zeitung*, in which I found some very interesting articles about Prigogine, written by the cosmologist Eric Iantsch. When I read those articles, I called Prigogine, who was in Brussels at that time, and he invited me to attend a conference about physics at Villa Monastero, on the Como Lake. We started a discussion then: the way economy looked at the business world did not reflect the real nature of business. Personally, I believed that the theory of dissipative structures applied to the business world could be especially adopted in conjunction with the concept of information. Prigogine invited me to his place in Brussels to discuss the matter in depth. A few weeks later I was driving to Brussels when I heard on the radio that Prigogine had been awarded with the Nobel prize. He stood by his word and invited me to his place for a party with friends. I was supposed to be there at seven. Seven means seven o'clock to a businessman, so I was alone at the beginning. Prigogine lived in a beautiful, modern house, with wonderful Indian statues ... among which I recognized the famous statue of Dancing Shiva. After showing me the rooms, Prigogine asked me to introduce the guests, one by one, as a house-steward. I did so. At a certain point, a lady asked me: what are dissipative structures? I took her to the statue of Dancing Shiva and told her: "You see, this statue is a symbol of dance and dance has no other purpose than beauty". In this way, the first message is to

act without thinking of any result. Shiva, the dancer, is inserted in a circle of flames which stand for the persistence of things in a steadily changing environment: this is the second message. Prigogine turned this symbol into an equation.

Since then, we have met many other times but, despite me asking to further discuss the link between dissipative structures and information, we have not gone further into this matter. The topic was later dealt with by Maturana and Varela, who introduced the concept of autopoiesis, and finally by Gell Mann at the Santa Fe Institute, who introduced the CAS, i.e., the Complex Adaptive Systems. The CAS allowed to include systems of individuals and ecological cycles in the complexity theory. However, we owe to Prigogine the acceptance of complexity by modern science, which is an impressive achievement.

Strategy and complexity

The coffee market is notoriously unpredictable and very complex indeed. According to Kathleen Eisenhardt, a professor at Stanford, managers dealing with turbulent market segments adopt simple rules to keep up with the complexity of everyday actions. What do you think about this?

You refer to weak signals in your book¹. The only way to predict the direction of wind when you are sailing is to watch the sea color. Such a weak signal can tell you many things: not only does it reveal that the wind is blowing from here or there, it also warns you when the wind is strong, so strong that you'd better take down the sails. There is no common rule which helps you predict things in a logical way. You can

1. A.F. De Toni and L. Comello (2005). *Prede o Ragni*. Utet: Torino.

follow a heuristic process on the basis of your experience but the problem is that managers are too strongly tempted to recall the past. All management schools tell their students: try and understand what you have done yesterday, do it today and do it again tomorrow. According to such rules, we codify a world view based on the past and not on the future and discontinuity.

So you are questioning the very concept of rule itself?

Rules are misleading. The linear extrapolation of a phenomenon, however turbulent this might be, is effective, provided that it lasts for a very short time. The concept of middle or long term linear extrapolation from the past cannot be applied to dynamic complex systems because non-linear equations are characterized by discontinuities and unpredictable bifurcations.

Some scholars think that strategy is an ex-post rationalization; they maintain that action comes before any strategy. What's your view of the problem of learning within this context?

A countryman says "my grandfather acted like that and I act like that because he acted like that". These words express a view in which knowledge is rooted in the past. This view has hindered human evolution from the fall of the Roman Empire to the time of Galileo. For around 1000 years human beings have looked back to the past to find truth and knowledge. There was a man called Aristotle who knew everything and we stuck to this reality. One day a man called Galileo took an inclined plane and began to study the motion of a little ball. He was the first who analyzed the behavior of little balls without considering Aristotle's words. Galileo revolutionized our view of the world by shifting the focus from the past (i.e., Aristotle) to the future. The most important advantage of having science as a source of knowledge is the freedom to get to know what is unknown. Those who are trapped in past experience are not capable of any renewal.

In his recent book² "The long tail" Chris Anderson uses a power law argument (popularized as the Pareto's 80/20 law) to describe the emergence of the 'economy of niches', which complements the more traditional "economy of hits". Do you think that this concept help describe the branding strategy promoted by illy?

We are one of a kind. We sell one single blend under one single brand. The other coffee producers assume that consumers' purchase power is distributed according to a Gaussian weighting and therefore address their products to less and more well-off people and to very well-off people. We have a realistic attitude toward consumers: we try to attract that 1% of them who are sensitive to our top-quality message. The illy brand which you can find here, in Tokyo or in Buenos Aires has the same meaning because there is an underlying relationship of trust and confidence based on reputation. And reputation means more than image - because an image can be sold - while reputation is built step by step by always keeping faith to promises.

So your motto is one-blend-one-brand...which is far from the Gaussian distribution... The policy which Illy promotes is to go after the tail of the distribution both in strategy and market.

The idea of one-blend-one-brand generates a positive feedback between the brand and the consumers and leads to a lock-in phenomenon. Using the jargon of physics, we can say that the lock-in between brand and consumers creates a steep barrier of potential energy around our niche. Such potential prevents incoming competitors to break into such niche.

Butterfly effect and Brazilian coffee

The butterfly effect is one of the fundamental intuitions of the complexity theory. Have you ever experienced the butterfly effect in your entrepreneurial career? If yes, have you ever used it as a strategic tool?

I'll tell you a story which concerns my family: during the 80s we noticed that the frequency

2. C. Anderson (2006). *The Long Tail*.

of purchasable coffee lots was steadily declining. So I went to Brazil to see why this was happening. I visited several cooperatives and I suddenly found the answer I was looking for: the market was becoming more and more concentrated and there was a high demand for large quantities of coffee at low prices. What solution to such a problem? In the cooperatives some people blended the incoming lots through huge shovels, thus increasing entropy. Quality corresponds to a low degree of entropy, though. So the fundamental question was: "How do we catch the best lots before they are blended together with other lots?" Riccardo, my son, said: "the cachemire industry experienced a similar problem". Indeed, the Zegna family noticed that the cachemire fibre was gradually shrinking and was dirtier and dirtier. To revert this trend, they put up a trophy as a prize for the best cachemire fibre. The result was that the cachemire fibre was beautiful again in four years. So we announced a trophy for the best Brazilian espresso coffee. We brought about a revolution in the history of Brazilian coffee: the idea of announcing a trophy competition, which goes back to 16 years by now, made the Brazilian people understand that a country with a 4000 \$ income per year cannot compete on price with a country such as Vietnam whose income is equal to 300 \$ per year. The right strategy to win over competition cannot therefore be a low price policy but high quality products!

So in short you used the prize as an attractor that pulled the quality producers from the amorphous mass of commodity farmers and in so-doing you 'broke the symmetry' of the commodity sector. The result was the emergence of a new business segment and channels around the idea of quality. Did you foresee all that happened later? Which have been the unpredicted effects of that initial intuition?

The impact of our initiative has been much greater than what we had foreseen. We simply wanted to solve our problem but, in fact, we changed the mentality of the Brazilian market. The number of people who take part in this event, which is causing a great stir, is steadily

increasing. In Brazil, the number of producers is very high: 250,000 people are coffee producers and 35-40 Million coffee sacks out of 120 Million sacks consumed worldwide are produced in Brazil. It is a huge country and its coffee area is as big as Europe. It takes a long time to convey such ideas, since they slowly filter into people's minds. We repeated our initiative in Columbia, India and Guatemala and here too we succeeded in involving a large number of people.

Innovation and illy. The contribution to making espresso what it is

Which innovations marked the history and the present of Illy caffè?

The first innovation has been the elimination of the chemical instability of roasted coffee. My father thought to remove the air but, instead of using the vacuum to eliminate oxygen, he decided to use an inert gas. If you use the vacuum to eliminate oxygen, you also remove volatile flavours. You hardly tell the difference between chicory and coffee with your nose closed but when you open your nose you suddenly recognize the coffee aroma. So volatile flavours must be carefully preserved by removing the air for a very short time and replacing it with nitrogen under positive pressure. It's the high quantity and quality of volatile flavours which makes our coffee so excellent. Secondly, my father invented an espresso machine which was able to separate motor pressure from thermal energy. In the early espresso machines, pressure was produced by a boiler which first generated hot water for the extraction process and then produced steam for the percolation under pressure. In the machine devised by my father pressure was generated by an air compressor to several atmospheres and hot water was produced by a boiler at low pressure and temperature. He produced around 100 machines like this. One of these machines ended up in a bar in Via Archimede, in Milan. Mr. Gaggia, the bar owner, was annoyed by the noise produced by the air compressor, so he devised a new machine starting from the idea of a winepress. The idea was brilliant but the press made the process so lengthy that Mr. Gaggia

asked Valente, a worker with some experience in mechanics, to simplify the machine. Valente invented a new machine, equipped with a piston, a spring and a lever: the lever pressed against the spring which generated pressure when it was released. The newly born lever espresso machine brought about a big revolution in the world of coffee-making.

Valente, who worked as a mechanic for Mr. Gaggia, wished to become his partner but Mr. Gaggia said: “No, we are not becoming partners, you are a mechanic and you are paid to make machines. Forget about it”. So Valente made the machine even simpler and began to compete with Gaggia. He launched Faema, thus giving rise to a long-lasting fight against Gaggia, to a third competitor’s advantage, Cimbali, which is nowadays the global market leader for espresso machines.

There were other significant innovations, such as the electronic selection machines, which scan 400 coffee beans per second and remove flaws, or the joint venture with Sortex, an English company. And then, let’s not forget that we first launched grinded coffee in single portions, which brought about a revolution in the global coffee market. We also introduced round resistance welding machines to produce 3 Kg containers and still many other groundbreaking inventions. We own a large number of patents (more than 100) and we are relentlessly searching for new ideas with the aim of meeting the needs of our ever sophisticated and demanding customers.

Where do I come from?

You are one of the few people in the world who managed to become a successful scientist and entrepreneur. Moreover, your family has moved from Austria-Hungary, Italy and is now engaged in the political field, in the Left-Center Wing. What is the common thread of this story?

Our genes, without any doubt. One of our ancestors was called Roessler, which is a Swabian name and, you know, the people coming from Swabia are notoriously very stubborn indeed. Another ancestor was called Illy; he was Hungarian and the Hungarian people are known as the salt of the earth. Then there was an Irish

ancestor called O’Connor who lived in Johannesburg and was in love with Berger, an adventurer from Trieste. We have adventure in our genes, we are eager to discover new things and take new paths. Just to quote an example, when I left for America to sell coffee there, people said I was a raving lunatic. America is the “navel of the world”, though, and everybody watches what happens in this country. Asians look east, Europeans look west and what happens in America will happen in the rest of the world, too. We have been in America for 26 years and we have begun to make good money 3 years ago. We lost money for 23 years! Anyhow, America opened us the door to Australia, New Zealand, China and Japan, to the world. Ethics is the common thread. We are Waldensians.

Ernesto Illy

Born: 18 July, 1925, in Trieste, Italy.

Died: 3 February, 2008, in Trieste, aged 82.

Ernesto Illy, chairman of the company Illycaffè’ from 1963 to 2004 and from 2004 its honorary chairman, was widely known as a perfectionist of coffee, an evangelist of espresso and one of the world authorities in the science, technology and business of espresso coffee. Illycaffè’ is the maker of an elite brand coffee.

Corby Kummer, author of *The Joy of Coffee*, said of Ernesto Illy on the New York Times: “He ran what amounted to the Bell Labs of coffee in Trieste” and “he was an international leader in the science of grading and choosing the coffee; in promoting research on how coffee should be grown; on engineering the machines and the way it’s roasted and brewed.”

The tireless work of Ernesto Illy has made people all over the world realize that a cup of espresso is the most sophisticated way of drinking coffee. An original business thinker, Illy launched the ‘one blend—one brand’ strategy. He was proud to say that customer can drink the same cup of Illy coffee in Tokio, Buenos Aires or London.

Ernesto Illy read chemistry at University of Bologna, where he got his degree in 1947.

Illy is survived by his wife, a daughter and three sons, one of whom, Andrea, is the current chairman of Illycaffè’.

Awards (selection)

- Cavaliere del Lavoro of Italy (Knight of Industry, 1994);
- Honorary doctorates and masters degrees (such as University of Udine, 2005);
- Centromarca brand organization (president, 1996-);
- Specialty Coffee Association of America (S.C.A.A.). “Lifetime Achievement Award” (1997);
- Monte Carmelo (Brazil) county (honorary citizenship, 2002);
- International Coffee Organization, London (chairman of the promotion committee, 2002-);
- Anacafè member of the order, Flor del Cafè (Guatemala, 2004).

Pierpaolo Andriani is Senior Lecturer in Management of Innovation at Durham Business School, Associate Professor at University of Salento, Italy and Visiting Scholar at the Anderson School, University of California, Los Angeles. His current research and publications focus on complexity theory and networks, and in particular on (a) the impact of power laws and fractals on organization theory; (b) the emergent properties of organizational networks (including industrial clusters); (c) distributed innovation.

Alberto F. De Toni is Dean of the Faculty of Engineering and Full Professor of “Operations Management” and “Complexity management” at the University of Udine. Alberto is coordinator of several research projects funded by the European Commission and the Ministry of University and Research. His scientific activity concerns the following fields: manufacturing strategy, operations and supply chain management, innovation management and complexity management.